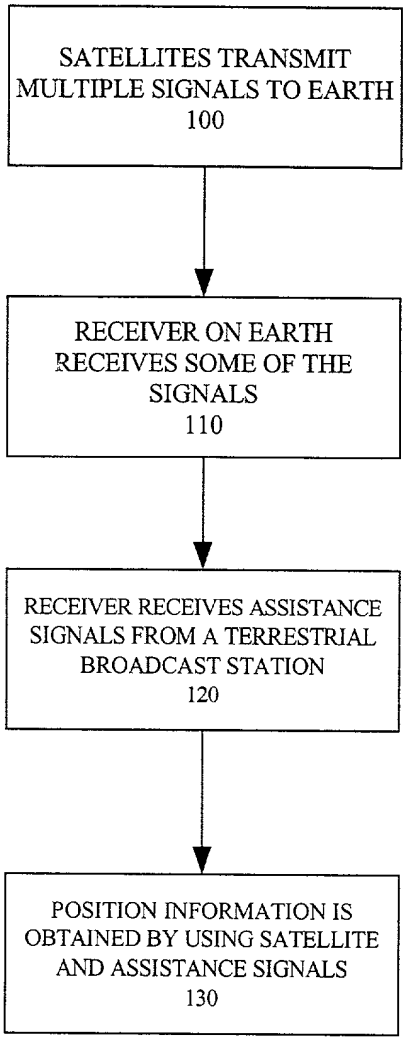

SATELLITES TRANSMIT MULTIPLE SIGNALS TO EARTH
100
RECEIVER ON EARTH RECEIVES SOME OF THE SIGNALS
110
RECEIVER RECEIVES ASSISTANCE SIGNALS FROM A TERRESTRIAL BROADCAST STATION
120
POSITION INFORMATION IS OBTAINED BY USING SATELLITE AND ASSISTANCE SIGNALS
130

FIGURE 1

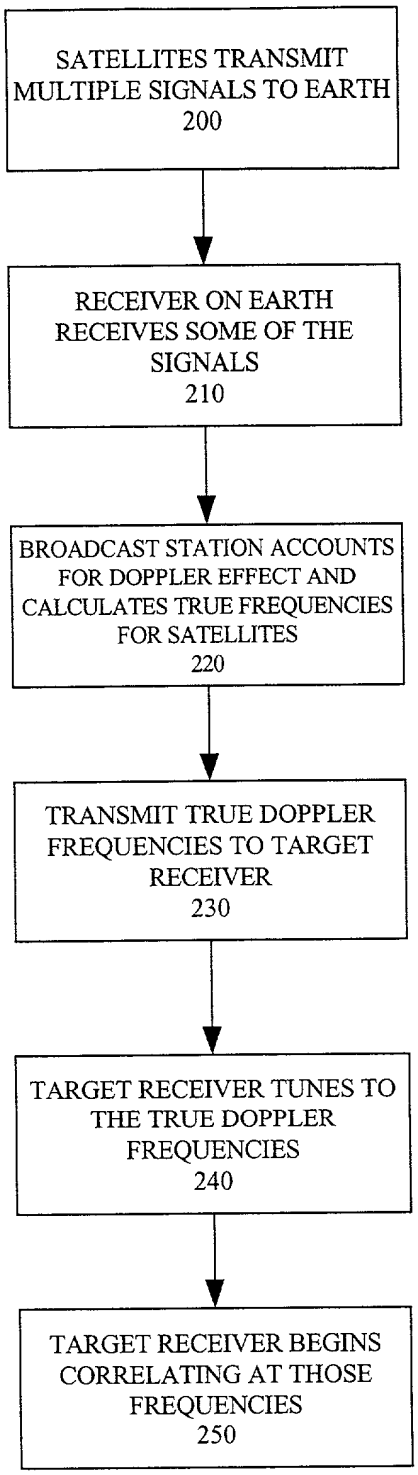

SATELLITES TRANSMIT MULTIPLE SIGNALS TO EARTH
200
RECEIVER ON EARTH RECEIVES SOME OF THE SIGNALS
210
BROADCAST STATION ACCOUNTS FOR DOPPLER EFFECT AND CALCULATES TRUE FREQUENCIES FOR SATELLITES
220
TRANSMIT TRUE DOPPLER FREQUENCIES TO TARGET RECEIVER
230
TARGET RECEIVER TUNES TO THE TRUE DOPPLER FREQUENCIES
240
TARGET RECEIVER BEGINS CORRELATING AT THOSE FREQUENCIES
250

FIGURE 2

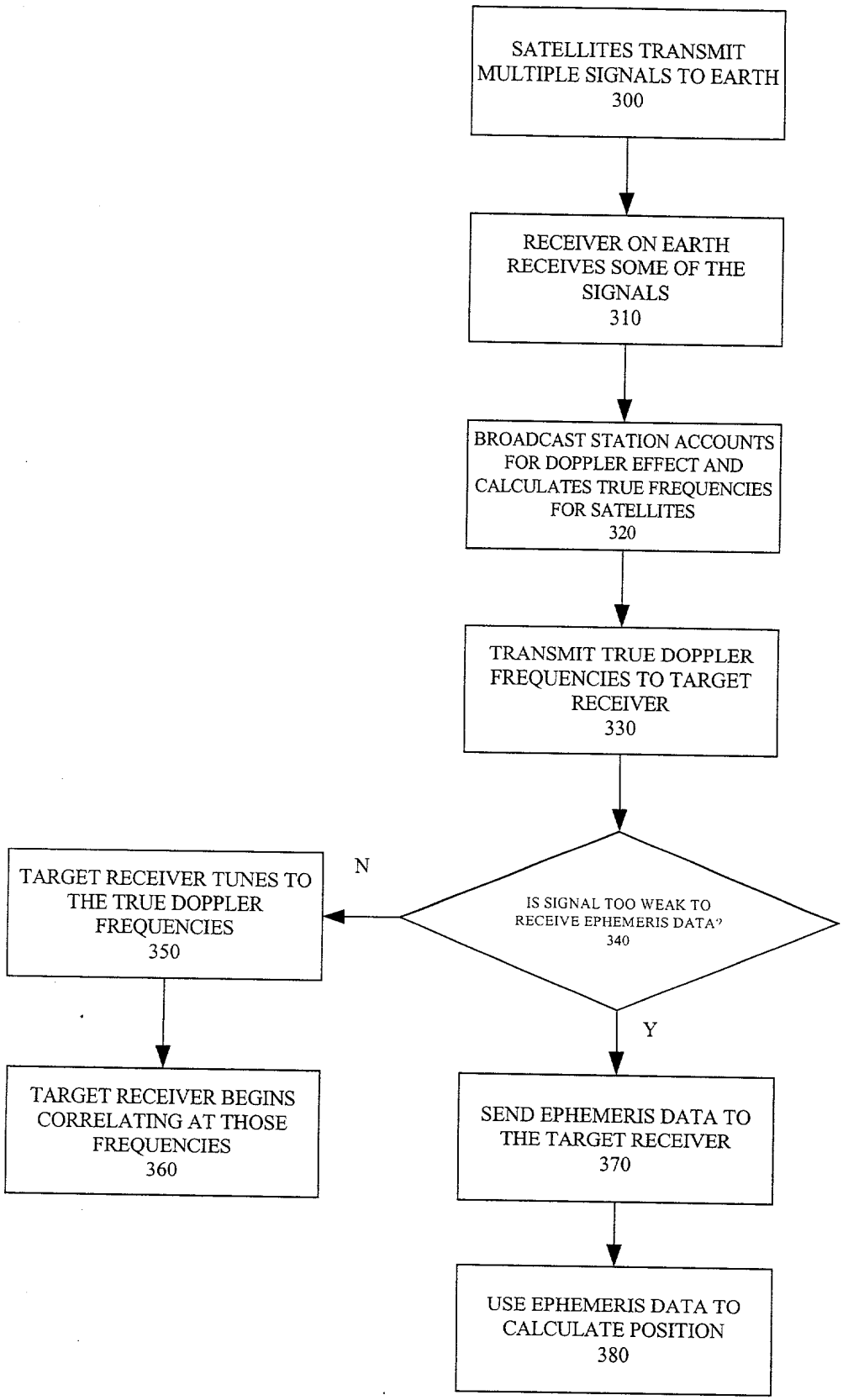

SATELLITES TRANSMIT MULTIPLE SIGNALS TO EARTH
300
RECEIVER ON EARTH RECEIVES SOME OF THE SIGNALS
310
BROADCAST STATION ACCOUNTS FOR DOPPLER EFFECT AND CALCULATES TRUE FREQUENCIES FOR SATELLITES
320
TRANSMIT TRUE DOPPLER FREQUENCIES TO TARGET RECEIVER
330
IS SIGNAL TOO WEAK TO RECEIVE EPHEMERIS DATA?
340
N
TARGET RECEIVER TUNES TO THE TRUE DOPPLER FREQUENCIES
350
TARGET RECEIVER BEGINS CORRELATING AT THOSE FREQUENCIES
360
Y
SEND EPHEMERIS DATA TO THE TARGET RECEIVER
370
USE EPHEMERIS DATA TO CALCULATE POSITION
380

FIGURE 3

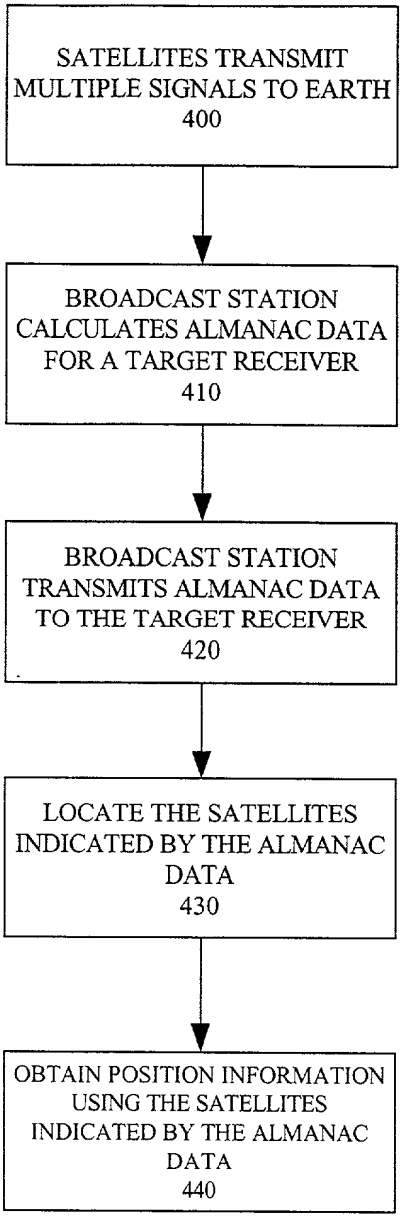

SATELLITES TRANSMIT MULTIPLE SIGNALS TO EARTH
400
BROADCAST STATION CALCULATES ALMANAC DATA FOR A TARGET RECEIVER
410
BROADCAST STATION TRANSMITS ALMANAC DATA TO THE TARGET RECEIVER
420
LOCATE THE SATELLITES INDICATED BY THE ALMANAC DATA
430
OBTAIN POSITION INFORMATION USING THE SATELLITES INDICATED BY THE ALMANAC DATA
440

FIGURE 4

FIGURE 5

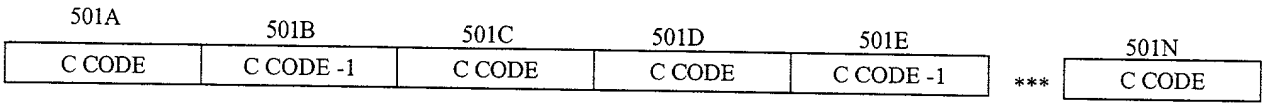
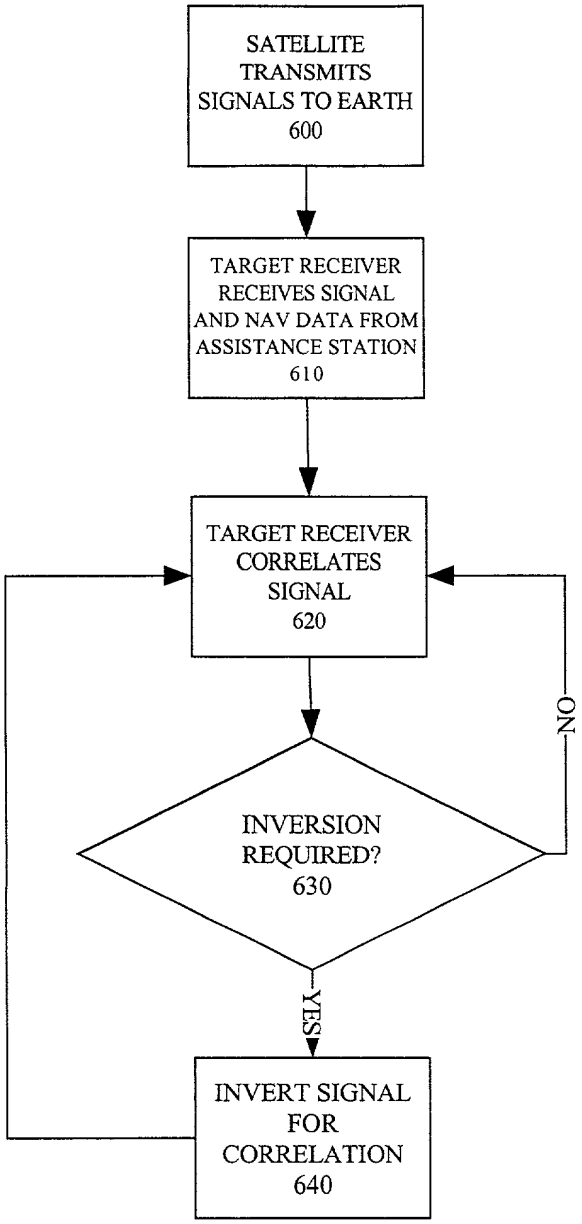

501A
C CODE
501B
C CODE -1
501C
C CODE
501D
C CODE
501E
C CODE -1
***
501N
C CODE

FIGURE 6



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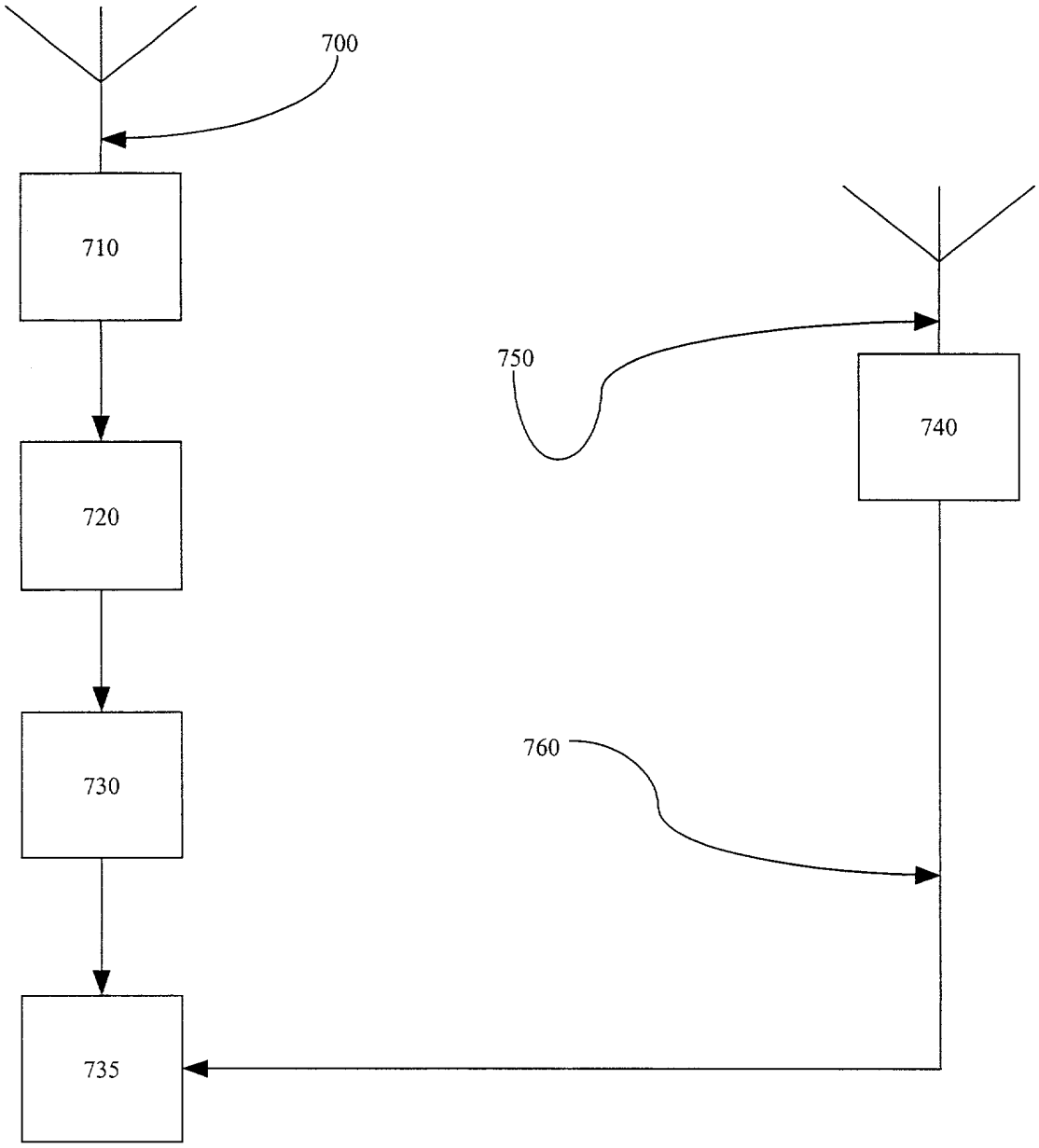

FIGURE 7

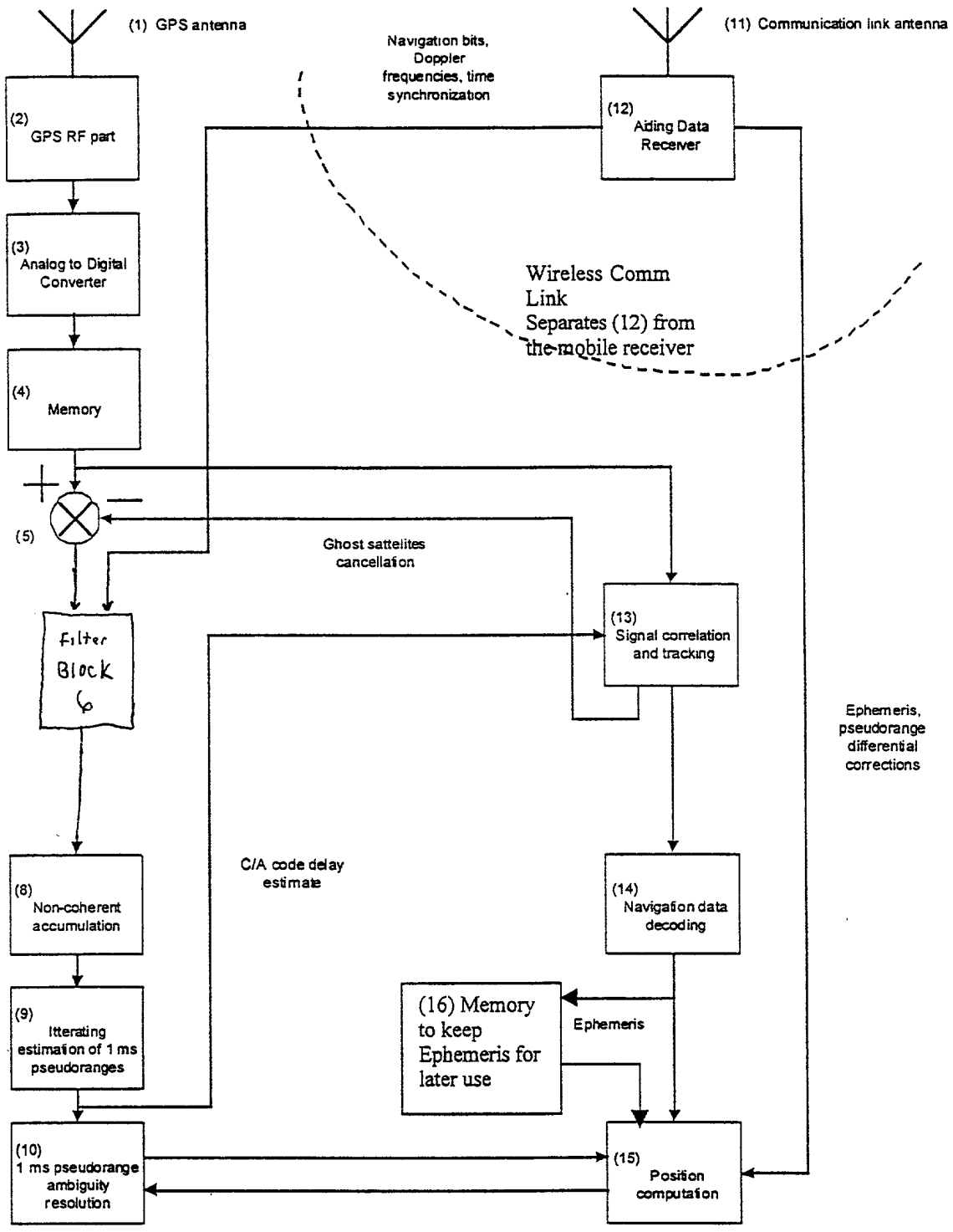
(1) GPS antenna
Navigation bits, Doppler frequencies, time synchronization
(11) Communication link antenna
(2) GPS RF part
(12) Aiding Data Receiver
(3) Analog to Digital Converter
Wireless Comm Link Separates (12) from the mobile receiver
(4) Memory
(5)
Ghost sattelites cancellation
Filter Block 6
(13) Signal correlation and tracking
Ephemeris, pseudorange differential corrections
C/A code delay estimate
(8) Non-coherent accumulation
(14) Navigation data decoding
(9) Itterating estimation of 1 ms pseudoranges
(16) Memory to keep Ephemeris for later use
Ephemeris
(10) 1 ms pseudorange ambiguity resolution
(15) Position computation

Figure 8